Space Weather Forecast

Issued on Saturday, 05 March 2022 at 00:46 Local

This forecast provides a four-day assessment of space weather events. The probabilities stated below are for reaching or exceeding the given levels. For more information about space weather impacts please see the Met Office Space Weather Scales https://www.metoffice.gov.uk/weather/learn-about/space-weather/uk-scales

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Space Weather Forecast Headline: Slight Chance of G1/Minor Geomagnetic Storms this UTC weekend. Daily Chance of R1 Minor Radio Blackouts throughout.

Analysis of Space Weather Activity over past 24 hours

Solar Activity: Solar activity was low over the period, with occasional low-level common-class X-ray flares observed. These events peaked with a small flare at 04/0043UTC from the largest sunspot region on the facing side near the southeastern horizon. Also of some note were a pair of magnetically bipolar spots near the sun's centre in close proximity to each other - with the easternmost of these showing proliferation in its trailers as its leader faded while the westernmost showed proliferation around its large trailing group. The current cohort of sunspots was rounded out by a final pair of simple, mature and stable unipolar groups nearing the northwestern solar horizon.

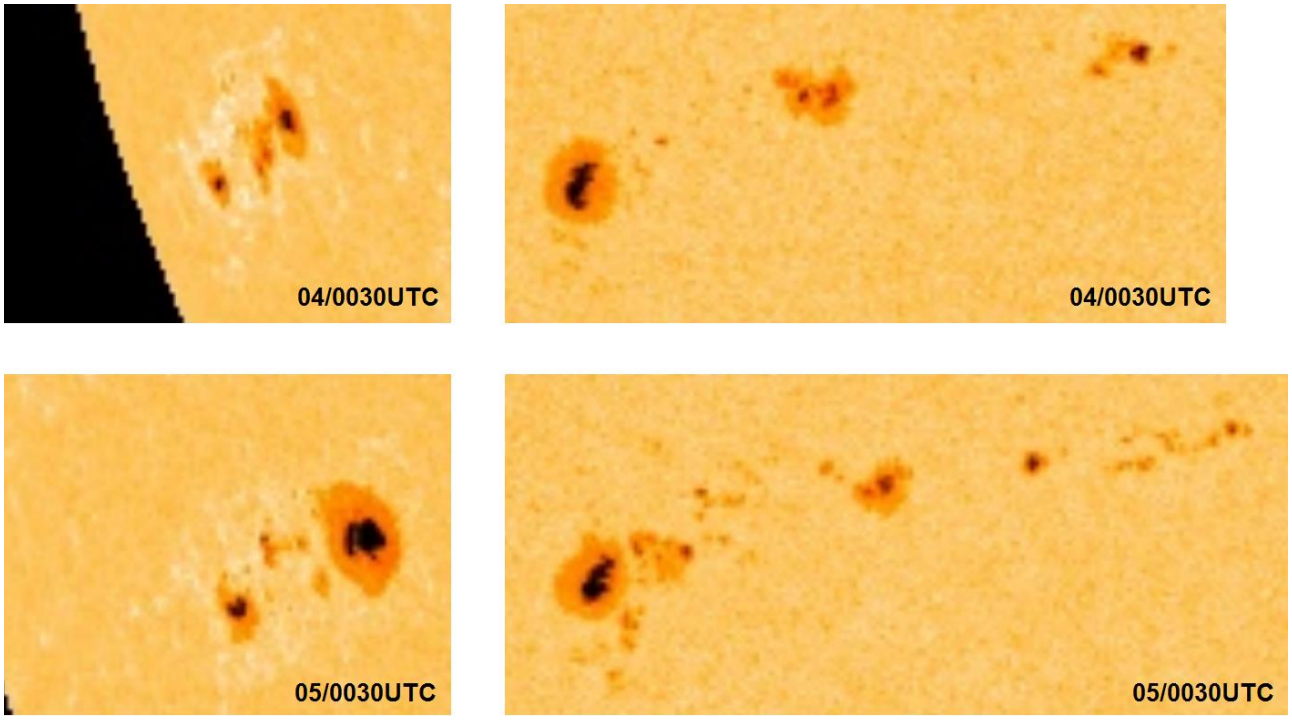

Figure 1: Evolution of the three magnetically bipolar sunspot groups on the sun in visible satellite imagery, 24 hours apart. The scale is the same in all images, and the division between the sunspot pair on the right is roughly halfway through the image (vertically). All sunspots can be seen to have grown, a sign of possible increased propensity to flare.

A small 'filament' (arc of plasma) was seen to disappear from the northwestern quarter of the sun on (for example) Cerro Tololo observatory imagery around 04/1500UTC, however this does not

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appear to have left the immediate solar environment. The main Coronal Mass Ejection (CME) activity in the 24 hours was a large but diffuse and slow far-sided event from the western solar hemisphere, seen into the UTC evening heading well south and away from the Earth on available imagery. No Earth-directed CMEs were in evidence.

Solar Wind / Geomagnetic Activity: The solar wind was symptomatic of intermittent connection to a 'coronal hole' fast wind. The solar wind speed was volatile in the 24 hours and slightly elevated, while the number of particles gradually fell to background. The magnetic field associated with these particles peaked early in the period before gradually falling, while the north-south component inherited a lot of the variability seen in other measures with frequent changes co-aligned and anti-aligned with Earth's field.

The net result of these solar wind measures was higher and more volatile than in recent days, although below Minor Storm G1 throughout.

Energetic Particles / Solar Radiation: No solar radiation storms were observed.

Four-Day Space Weather Forecast Summary

Solar Activity: Solar activity is expected to be low, with further occasional common-class flares and a chance of moderate-class flares. No significant regions are expected to rotate onto or leave the visible side of the sun through the period.

Solar Wind / Geomagnetic Activity: There are two parts to the geomagnetic forecast: the current 'coronal hole' fast wind; and also a possible glance from a CME emitted on 02/1739UTC in relation to the moderate class X-ray flare from a now-faded sunspot.

There remains a slight chance of Minor Storm G1 from the current fast wind into the UTC weekend, with this risk extending later in the weekend as a result of the uncertain influence of the aforementioned CME. Activity should wane into the new working week, becoming most reliably quiet by day four, Tuesday 08 March.

Energetic Particles / Solar Radiation: No solar radiation storms are expected.

Geomagnetic Storms:

Geo-Magnetic Storm Probability (Exceedance)	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC) (%)	Day 2 (00-24 UTC) (%)	Day 3 (00-24 UTC) (%)	Day 4 (00-24 UTC) (%)
Minor or Moderate	G1 to G2	No	20	10	5	1
Strong	G3	No	1	1	1	1
Severe	G4	No	1	1	1	1
Extreme	G5	No	1	1	1	1

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Radio Blackouts - X Ray Flares:

X Ray Flares	Level	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability			(%)	(%)	(%)	(%)
Active	R1-R2 M Class	No	20	20	20	20
Very Active	R3 to R5 X	No	1	1	1	1

Solar Radiation Storms - (High Energy Protons):

Radiation Storms	Level (cm^{-2} sr^{-1} s^{-1})	Past 24 Hours (Yes/No)	Day 1 (00-24 UTC)	Day 2 (00-24 UTC)	Day 3 (00-24 UTC)	Day 4 (00-24 UTC)
Probability (Exceedance)			(%)	(%)	(%)	(%)
Active	≥ S1	No	1	1	2	2
Very Active	≥ S3 *	No	1	1	1	1
* S3 ≥ 10 MeV ≥ 1000 pfu and / or ≥ 50 MeV ≥ 10 pfu. (pfu = $cm^{-2}sr^{-1}s^{-1}$)						

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